

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A metrology instrument for samples containing grating-like microstructures comprised of a plurality of linear elements thereon, the instrument comprising:

~~means for supporting a sample in measurement relation to the instrument, the sample having at least one grating-like microstructure formed thereon, the sample producing a characteristic optical signature when illuminated which is indicative of parameters of interest of the microstructure,~~

an illumination source directing light along an illumination path from the illumination source to the sample, the sample having at least one grating-like microstructure formed thereon, the sample producing a characteristic optical signature when illuminated,

an elongated pupil aperture located in the illumination path,

an objective focusing the light received from the aperture to the sample, the elongated pupil aperture and objective defining an elongated illumination spot on the sample, the elongated pupil aperture and elongated illumination spot having respective long directions which are perpendicular to each other, the measurement relation of the sample to the instrument being such that the long direction of the illumination spot is oriented generally transverse to linear elements of the microstructure,

an optical detector located along a reflection path means for collecting and detecting the optical signature produced from the illuminated sample, and

processing means for determining from said detected signature the parameters of interest of the grating-like microstructure on the sample.

2. (Currently Amended) The instrument of claim 1 wherein the optical signature comprises reflectivity data acquired over a range of wavelengths, ~~the optical means including a radiation sensing detector.~~

3. (Previously Presented) The instrument of claim 1 wherein the objective produces focused illumination with a narrow range of incidence angles in the direction generally transverse to the linear elements of the microstructure.

4. (Original) The instrument of claim 1 wherein the microstructure to be measured is a checkerboard-type bigrating structure, rows and columns of features defining linear elements of the microstructure, the elongated pupil aperture having a width dimension and the objective having focusing parameters selected such that the illumination spot has a narrow dimension corresponding to a width of a single row or column of the bigrating structure.

5. (Currently Amended) The instrument of claim 1, wherein the illumination spot is contained within the linear elements of the microstructure, wherein the processing means determines a best fit of the detected optical signature to a theoretical signature corresponding to a specific set of values for the parameters of interest.

6. (New) A metrology structure for analyzing a sample containing a plurality of linear microstructures positioned thereon, the structure comprising:
a light source for illuminating the sample;
a limiting aperture positioned along a beam path between the light source and the sample, the limiting aperture having an elongated shape such that a portion of light from the light source passing through the limiting aperture has an elongated beam shape; and
an objective lens positioned along the beam path between the limiting aperture and the sample such that the portion of light having the elongated beam shape is focused on the sample as an elongated beam spot, an elongated spot axis of the elongated beam spot being perpendicular to an elongated aperture axis of the limiting aperture, the elongated spot being focused on the plurality of linear microstructures such that the elongated spot falls within the microstructures and the elongated spot axis is perpendicular to the plurality of linear microstructures.

7. (New) A metrology structure according to claim 6, further comprising:
an optical detector for detecting light reflected from the elongated beam spot on
the plurality of linear microstructure.
8. (New) A metrology structure according to claim 7, further comprising:
a beam splitter positioned along the beam path allowing light to pass from the
light source to the sample, and allowing light reflected from the elongated beam spot to
be directed to the optical detector.
9. (New) A metrology structure according to claim 6, wherein:
the plurality of linear microstructures includes a plurality of rows of linear
microstructures, and wherein the elongated beam spot is contained within one of said
rows.
10. (New) A metrology structure according to claim 6, wherein:
the elongated shape of the limiting aperture is selected from the group consisting
of elliptical and rectangular elongated shapes.
11. (New) A metrology structure according to claim 6, wherein:
the elongated shape of the limiting aperture is variable in at least one of size and
shape.
12. (New) A method for optically analyzing a sample containing a plurality of linear
microstructures positioned thereon, the method comprising:
directing a light beam along a beam path from a light source to the sample;
shaping the light beam by passing the light beam through an elongated pupil
aperture positioned along the beam path between the light source and sample; and
focusing the shaped light beam on the sample as an elongated beam spot, the
elongated beam spot being contained within the plurality of linear microstructures and
having an elongated axis perpendicular to the orientation of the linear microstructures.

13. (New) A method according to claim 12, further comprising:
detecting the light beam reflected from the elongated beam spot on the sample.
14. New) A method according to claim 13, further comprising:
analyzing the reflected light beam in order to determine at least one of a line width, critical dimension, profile shape of at least one of the linear microstructures.
15. (New) A method according to claim 12, further comprising:
detecting the light beam reflected from the elongated beam spot on the sample over a range of wavelengths.
16. (New) A metrology structure for analyzing a sample containing a plurality of linear microstructures, the structure comprising:
a light source capable of illuminating the sample with a light beam;
a limiting aperture positioned along a beam path between the light source and the sample, the limiting aperture having an asymmetrical shape such that a range of light incidence of the light beam on the sample is limited in a direction substantially perpendicular to linear axes of the linear microstructures; and
an objective lens positioned along the beam path between the limiting aperture and the sample such that the portion of light having the limited range is focused on the sample as an asymmetrical beam spot.